The Effect of Climate Change on the Biogeochemistry of Estuarine Soft Soils

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Background

This project aims to focus on the biogeochemistry of estuaries in relation to the effect of climate change. Estuaries have known benefits such as trapping, filtering and recycling suspended particulate matter and other components that have the potential to pose great harm to human health through pathogenic viruses. The effects of climate change are likely to cause loss of on habitat in estuarine ecosystems. Therefore, soft soils are also expected to be impacted. This project uses analyses to demonstrate how various processes triggered by climate change may impact the biogeochemistry of estuarine soft soils. Considerations of climate change were used for analyses were those of increased sea surface temperature, rise in sea level, storm surge, rainfall and river flow [1]. According to the Intergovernmental Panel on Climate Change (IPCC), global temperatures are likely to increase during the 21^{st} century [2]. For instance, the UK sea surface is expected to warm by up to 4^0 C by the end of the century [3]. Global mean sea levels are also expected to rise to 74 cm, according to amount predictions of future carbon dioxide emissions [4]. This paper aims to identify how such changes will impact the biogeochemistry of the estuarine soft soil.

Project Aim

This research aims to identify the present biogeochemistry of estuarine soft soils through design of a biogeochemistry based sampling program. It will measure soil texture, color, aggregation, bulk density, porosity, organic horizon mass and layer thickness, total C and nutrient concentrations (N, P, S), and many other parameters in a present soil sample. It will then compare this present state to previous information on the biogeochemistry of estuarine soft soil in an attempt to highlight changes that may have taken place. This will encourage identification of the effects of climate change on the evaluated soil. The different consequences of climate change to be considered include sea surface temperature, rise in sea level, storm surge, rainfall, and river flows. Results of the biogeochemistry sampling will be related to estuarine soft soil. Any limitations to the research will be explored according to the ideas derived from in situ study, as well as the data from previous surveys.

Methodology

This research will apply a program for biogeochemistry sampling. It will feature measurements that will enable evaluations of biogeochemical changes in estuarine soft soil. Measurements will focus on the drivers of biogeochemical cycles including soil physical and

chemical properties [5], soil temperature, and soil moisture content [6]. Analysis for soil texture, color, aggregation, bulk density, porosity, organic horizon mass and layer thickness, total C and nutrient concentrations (N, P, S), and many others will be made. Such attributes impact the distribution of resources in the soil matrix, such as air space and the development of hydrological flow paths [7]. There will also be a collection of previous surveys conducted on estuarine soil samples to support identification of changes that may have taken place over past years.

Project Significance

This research has the potential to create awareness on the impacts that climate change may have on estuarine soft soil. It has the capability of closing the gap in knowledge that exists in the field. By developing a clear understanding of the effects of climate change on biogeochemistry of estuarine soft soil, specialists will be better placed to make recommendations to the public. For example, the research may be applied to suggest ways to reduce the impacts of climate change on the environment. Specialists will have access to explanations on how such effects are indirectly impacting on human health [8]. Therefore, this project will serve as a tool for reference, especially for scholars who specialize in the field.

Reference

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